

AMENDMENTS TO THE CLAIMS

Claims 1-29 are pending.

Please amend claims 1, 4, 6, 8, 15, 19-20, 22, and 26-27

Kindly cancel claims 7, 14, and 21, without prejudice.

No claims are added.

Accordingly, claims 1-6, 8-13, 15-20, and 22-29 remain pending.

The following listing of claims replaces all prior versions, and listings of claims in the application.

1. (Currently amended) A method for providing thread scheduling in a device, the device comprising one or more hardware elements operatively coupled to an operating system comprising a plurality of program modules, the method comprising:

scheduling one or more threads according to a predetermined periodic rate;

determining whether or not there are any threads to execute; and

responsive to a determination that there are no threads to execute, deactivating ~~at least one subset of components for a dynamic variable amount of time, the one subset being selected from a group of components comprising~~ one or more of the hardware elements and the program modules for a dynamic variable amount of time, the dynamic variable amount of time being independent of the predetermined periodic rate and being based on a sleep state of a set of threads in a sleep queue.

2. (Original) A method as recited in claim 1, wherein the dynamic variable amount of time is based on a maximum amount of time that a thread can yield before needing to be scheduled for execution.

3. (Original) A method as recited in claim 1, wherein the device is a battery powered device.

4. (Currently amended) A method as recited in claim 1, wherein the operating system comprises ~~an operating system selected from a group of operating systems comprising~~ is a Microsoft WINDOWS CE, Linux, WindRiver, QNX, or PALM operating system systems.

5. (Previously presented) A method as recited in claim 1, wherein the predetermined periodic rate is a millisecond.

6. (Currently amended) A method as recited in claim 1:
wherein the providing further comprises setting a system timer to generate a notification at the predetermined periodic rate;

wherein the deactivating further comprises resetting the system timer to generate the notification after the dynamic variable amount of time has elapsed since the deactivating; and

wherein the method further comprises:
receiving the notification after the dynamic variable amount of time has elapsed since the deactivating; and

responsive to the receiving:

resetting the system timer to generate the notification
at the predetermined periodic rate; and

activating the ~~at least one subset of components~~ the
one or more of the hardware modules and the program modules.

7. (Canceled).

8. (Currently amended) A method for providing thread
scheduling in a device, the device comprising one or more hardware
elements operatively coupled to an operating system comprising a plurality
of program modules, the method comprising:

scheduling one or more threads at a predetermined periodic rate;

determining whether or not there are any threads to execute;

responsive to a determination that there are no threads to execute,
~~deactivating at least one subset of components for a dynamic variable~~
~~amount of time, the one subset being selected from a group of components~~
~~comprising one or more of the hardware elements and the program modules~~
for a dynamic variable amount of time, the dynamic variable amount of
time being based on a sleep state of a set of threads in a sleep queue and
independent of the predetermined periodic rate; and

activating the ~~one subset of components~~ one or more of the hardware
elements and the program modules only when the operating system needs
to perform an action selected from a group of actions comprising
scheduling a thread for execution upon expiration of the dynamic variable

1 amount of time since the deactivating, or upon receipt of an external event
2 that is not a system timer event.

3
4 9. (Original) A method as recited in claim 8, wherein the device
5 comprises a battery powered device.

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7 10. (Original) A method as recited in claim 8, wherein the
8 operating system comprises a Microsoft WINDOWS CE operating system.

9
10
11 11. (Previously presented) A method as recited in claim 8,
12 wherein the predetermined periodic rate is a millisecond.

13
14 12. (Original) A method as recited in claim 8:
15 wherein the scheduling further comprises setting a system timer to
16 the predetermined periodic rate, the predetermined periodic rate
17 corresponding to a thread scheduling accuracy; and
18 wherein the deactivating further comprises resetting the system timer
19 to generate a notification after the dynamic variable amount of time has
20 elapsed since the deactivating.

21
22 13. (Original) A method as recited in claim 8:
23 wherein the deactivating further comprises resetting a system timer
24 to generate a notification after the dynamic variable amount of time has
25 elapsed, the dynamic variable amount of time being a maximum amount of

1 time that a thread can yield to other threads before needing to be scheduled
2 for execution; and

3 wherein the activating further comprises resetting the system timer
4 to the predetermined periodic rate to provide substantial thread scheduling
5 accuracy.

6
7 14. (Canceled).

8
9 15. (Currently amended) A computer-readable storage medium
10 containing computer-executable instructions for scheduling threads in a
11 device, the device including an operating system comprised of a plurality of
12 program modules that are in turn coupled to one or more hardware
13 elements, the computer-executable instructions comprising instructions for:
14 determining at a periodic rate whether or not there are any threads to
15 execute; and

16 responsive to a determination that there are no threads to execute,
17 ~~deactivating at least one subset of components for a dynamic variable~~
18 ~~amount of time, the at least one subset being selected from a group of~~
19 ~~components comprising the one or more of the program modules and one or~~
20 ~~more of the hardware elements~~ for a dynamic variable amount of time, the
21 dynamic variable amount of time being independent of the periodic rate, the
22 dynamic variable amount of time being based on a sleep state of a set of
23 threads in a sleep queue.

1 16. (Original) A computer-readable storage medium as recited in
2 claim 15, wherein the dynamic variable amount of time comprises a
3 maximum amount of time that a thread has specified that it will yield to
4 other threads before it needs to be scheduled for execution.

5
6 17. (Original) A computer-readable storage medium as recited in
7 claim 15, wherein the device comprises a battery powered device.

8
9 18. (Original) A computer-readable storage medium as recited in
10 claim 15, wherein the operating system comprises a Microsoft WINDOWS
11 CE operating system.

12
13 19. (Currently amended) A computer-readable storage medium as
14 recited in claim 15, wherein the computer-executable instructions further
15 comprise instructions for:

16 in the deactivating, configuring a system timer to send a first timer
17 interrupt after the dynamic variable amount of time has elapsed, the
18 dynamic variable amount of time being a maximum amount of time that a
19 first thread can yield to a second thread before the first thread needs to be
20 executed; and

21 responsive to receiving the first timer interrupt:

22 (a) configuring the system timer to send a second timer interrupt at
23 the periodic rate; and
24
25

1 (b) activating the ~~deactivated at least one subset of components~~ one
2 or more of the program modules and the hardware elements to determine if
3 there are any threads to execute.
4

5 20. (Currently amended) A computer-readable storage medium as
6 recited in claim 15, wherein the computer-executable instructions further
7 comprise instructions for:

8 receiving an external interrupt before the dynamic variable amount
9 of time has elapsed since the deactivating, the external interrupt not being a
10 system timer interrupt; and

11 responsive to receiving the external interrupt, processing the external
12 interrupt such that the ~~at least one subset of components~~ one or more of the
13 program modules and the hardware elements remain deactivated for the
14 dynamic variable amount of time.
15

16 21. (Canceled).
17

18 22. (Currently amended) A device comprising:

19 a processor ;

20 a plurality of hardware elements coupled to the processor; and a
21 memory coupled to the processor, the memory comprising computer-
22 program instructions executable by the processor, the computer-program
23 instructions comprising a scheduler program module, a hardware
24 abstraction layer (HAL) program module, one or more operating system
25 program modules, and a set of application program modules;

1 wherein the scheduler comprises computer-executable instructions
2 for:

3 scheduling threads for execution at a periodic time interval;

4 determining that there are no threads to execute; and

5 wherein the HAL, responsive to the determining, comprises
6 computer-executable instructions for deactivating, for a dynamic variable
7 amount of time, ~~at least one subset of components selected from a group of~~
8 ~~components comprising one or more of~~ the scheduler, the hardware
9 elements, the one or more operating system program modules, and the
10 application program modules, the dynamic variable amount of time being
11 independent of the periodic time interval and being based on a sleep state of
12 a set of threads in a sleep queue.

13
14 23. (Original) A device as recited in claim 22, wherein the
15 dynamic variable amount of time is based on a maximum amount of time
16 that a thread can yield before needing to be scheduled.

17
18 24. (Original) A device as recited in claim 22, wherein the
19 periodic time interval is a millisecond.

20
21 25. (Original) A device as recited in claim 22, wherein the device
22 comprises a battery powered device.

23
24 26. (Currently amended) A device as recited in claim 22, wherein
25 the operating system is ~~an operating system selected from a group of~~

1 ~~operating systems comprising a~~ Microsoft WINDOWS CE, Linux,
2 WindRiver, QNX, or Palm ® operating system systems.
3

4 27. (Currently amended) A device as recited in claim 22, wherein
5 the HAL further comprises computer-executable instructions for re-
6 activating the at least one subset of components after the dynamic variable
7 amount of time has elapsed since the ~~at least one subset of components~~ one
8 or more of the program modules and the hardware elements were
9 deactivated.
10

11 28. (Original) A device as recited in claim 27, wherein the
12 scheduler is re-activated in a manner that allows the scheduler to schedule
13 threads based on the periodic time interval.
14

15 29. (Original) A device as recited in claim 22, wherein after the
16 scheduler is deactivated, the HAL further comprises computer-executable
17 instructions for receiving a notification in response to an external event, the
18 external event not being a system timer event, responsive to receipt of the
19 notification, the HAL processing the notification in a manner that the
20 scheduler remains deactivated for the dynamic variable amount of time.
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